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# SPOTS and STRIPES

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This appealing baby face belongs to Riley, the lesser panda being hand-reared at the home of Dr. Clint Gray, Zoo Veterinarian.

—Photo by Donna Grosvenor

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## SLOTHS, ANTEATERS, AND ARMADILLOS

Mid-summer got you down? Take a trip to the Zoo, which by the way has never been more beautiful than it is now. Go there, and just for hot weather therapy watch the coolest, loosest creatures in town, the sloths. When one of them moves, which is as seldom as possible, he seems not to walk or crawl or even to creep, but rather to gradually flow, like well-behaved ketchup.

The sloths are quartered in the lion house. Up the hill in the small mammal house they have some distant cousins, the anteaters and armadillos. These seemingly disparate families make up a single zoological order, the edentates, or Edentata. Taken as a group they are as interesting as any in the animal kingdom.

The scientific name, Edentata, means "without teeth", a big misnomer that for all practical purposes could be ignored. While all three families lack incisors and canines, only the anteaters are entirely toothless and the giant armadillo, when young, has as many as 100 teeth! The link between sloths, anteaters, and armadillos lies principally in their common ancestry although they also share certain physiological characteristics. They are exclusively New World animals (so-called Old World anteaters belong to a different order), and with the exception of the nine-banded armadillo are all restricted to tropical Central and South America. An intriguing chapter in zoological history revolves about their evolution and distribution.

It began 60 to 70 million years ago in the epoch known as the Paleocene. The so-called Age of Dinosaurs was in its twilight and early types of mammals were established on the continents. Among them were paleanodonts, queer little primitives that ate insects. They were the common ancestor of a vast and varied population of edentates.

During part of the Paleocene a land bridge connected North and South America, just as it does today. It had not always been there, however, and would periodically vanish again. Across this bridge, the paleanodonts found their way from North to South America, along with marsupials and condylarths. Then the land bridge disappeared under water and South America stood isolated. Totally un-

disturbed by the animal invasions and migrations that were going on elsewhere on earth, a unique animal kingdom sprang into being. Edentates, like the other mammalian types, diversified over the millions of years to play many ecological roles. There were many, many types of edentates. The armadillo seems to have come first among the families that still survive today, and much later came the sloths and anteaters.

During the so-called Ice Age, the edentates produced gigantic forms. Ground sloths as large as elephants lumbered through primitive forests. Glyptodonts, which were armadillos 14, even 20 feet long and six feet tall, haunted parts of America. These giants survived for a long time. Fossils of ground sloths at least as large as cattle have been unearthed alongside the relics of primitive man.

Although giant sloths and armadillos survived until fairly recent times, the hey-day of the edentates was already spent. None survived in North America after the Ice Age. In Central and South America, the great variety of their species diminished. For example, the only sloths that survived were those that adapted to an arboreal way of life.

Today, there are just two varieties of sloths, both tree-dwelling. There are three principal species of anteaters. The armadillos, ancient and tenacious, fare better with their approximately 20 species.

Most of the edentates are somewhat difficult to keep in captivity, and some are practically impossible. The three-toed sloth, for example, rarely survives for long despite the most exacting and tender care. Thus the NZP collection of edentates, while nicely representative, will not be complete until veterinary science shows the way to satisfy the special needs of the more difficult representatives of this order.

The two-toed sloth of tropical Central and South America lives an upside-down life, propped in tree branches or hanging suspended by powerful curving claws from whatever can be grasped. Upside down he eats, sleeps, and the female gives birth. He has coarse brownish hair that grows in the "wrong" direction as viewed by our eyes, but how else can one repel rain when one is hanging by his toes from a tree limb? In the

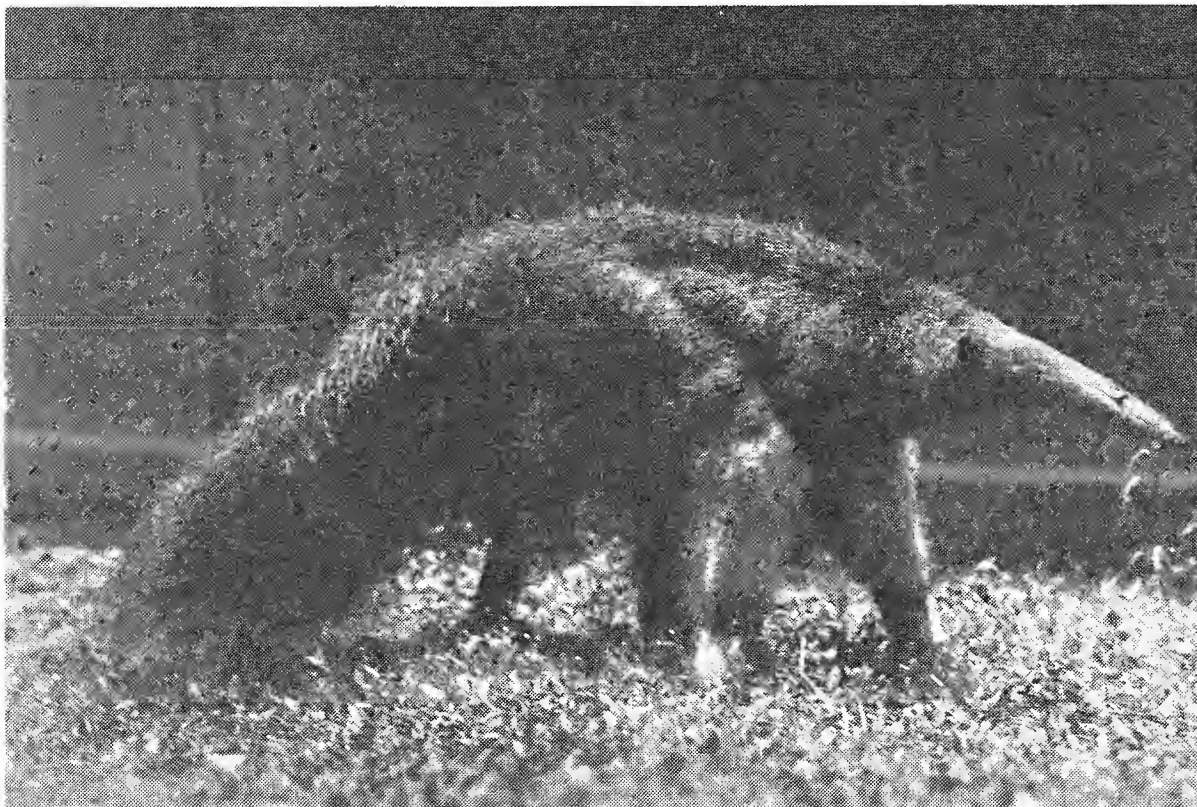
wild, he frequently looks greenish during the wet season because algae grow on his fur.

All sloths have long legs and arms. Their feet are curved and narrow, with their two or three toes bound together with skin and tissue. They are unable to "walk," and if forced to the ground pull themselves along on their bellies. Thus they are apt to remain in the same tree, or closely adjoining ones, for their entire life. They eat leaves, twigs and fruit. Two-toed sloths have the lowest body temperature of any mammal. The temperature also has a characteristic of varying

comes from humid forests or savannah regions. He is strictly a ground dweller, never climbing trees as other anteater species do. Overland, he can shuffle along at an adequate pace, even galloping in an awkward way, always with his long claws curved inwards so that he is moving on the sides of his feet and his knuckles.

The individual at our Zoo has evidently grown lazy since room service caters all his meals. He is usually seen sound asleep. Some zoo-faithful visitors who have been coming for years claim they have never seen any

NZP Photo



The giant anteater has been a Zoo resident since June 11, 1946

greatly with fluctuating temperature in the air. This is extremely unusual in mammals.

Most of the sloth's movements are extremely slow. When one of the four two-toed sloths at our Zoo inches across the cage, suspended from the wire mesh ceiling, it is a bit like some maple syrup dream. He can, however, whip forth one of the hooked claws with surprising abruptness. Their flattish round heads can turn as if on rubber necks, nestling into their chests or revolving a full 270 degrees.

The small mammal house contains a lazy giant anteater and a pair of tamanduas, or collared anteaters. Anteaters range through Central America south to Paraguay. They are furnished with sticky tongues which whip forth from their long tubular mouths to capture ants and other insects. Powerful claws are specialized tools used to get at the animal's prey, especially to rip apart termite nests.

The giant anteater, with his familiar narrow body, long snout and great pluming tail,



A sloth's-eye view is of an upside-down world

more motion than wispy tail hairs moving in the breeze of a fan. Nonetheless, around feeding time, you may catch him taking his constitutional around the cage, inspecting each corner and looking surprisingly bright-eyed and lively. Meals, incidentally, do not consist of ants. He thrives on a kind of ant-substitute gruel.

The nearby tamanduas bear little resemblance to their giant anteater cousin. They are much smaller, with shorter snouts, and lack that princely plume of a tail. In fact, their tails, which are prehensile for grasping tree-limbs, are a blotchy pink and black, with only a few redeeming bristly hairs. Never mind, our NZP tamanduas have lovely ears, petal shaped.

When the tamanduas move, they seem to be in a state of perpetual motion whether climbing or descending or advancing on the thickly cushioned outsides of their feet. It seems one smooth liquid movement, remarkable to watch.



In the wild, tamanduas spend most of their lives in trees. Thus they add such items as bees and tree termites to their diets, although occasionally attacking anthills on the ground. Their strong claws can be used in self-defense if they are threatened.

There is a third type of anteater, the silky, or two-toed. Very rare in captivity and difficult to keep, it is only occasionally seen in collections. The silky anteater is a tiny animal, only about seven inches long except for its important prehensile tail which more than doubles its length. They are nocturnal and seen only by chance, as they spend the daylight hours curled in tight balls, sometimes in hollow trees.

Armadillos are prehistoric in appearance. In truth they are older than most other living mammals. The only species represented in our Zoo is the nine-banded armadillo, which is the sole edentate whose range extends into the United States. They are small and short legged, and seem ever to be busy during their waking hours. Their food consists of insects, small reptiles, or possibly a stolen egg when available. The armored shell is protective. Most kinds of armadillos will occasionally attempt to curl into a ball when threatened, to protect their exposed parts. Only one species, however, is truly able to enclose itself completely within its shell. Our nine-banded variety will sometimes make the effort, but is more apt to speed for cover in a burrow. Like most types of armadillos, his flesh is good to eat, so he has good cause to make a quick exit.

All the edentates at the National Zoo make good subjects for summer-time animal gazing. They are most enjoyable when one takes time to watch them closely instead of hurrying on. And in this weather who wants to hurry? Make them a special subject for your next Zoo visit.

—Jocelyn Arundel

## ROLE OF THE ZOO IN CONSERVATION OF WILDLIFE

(Excerpts from John Perry's address to the Friends of the National Zoo, June 10)

Much has happened in nine years. In 1960

the National Zoo had a budget only half as large as we have today. The Zoo had no capital budget nor any plans for major new construction. A public street ran through the center of the Zoo, often jammed with traffic. That was the year the Friends of the National Zoo published a manifesto entitled "The Crisis at the National Zoo."

On December 16, 1960, the Friends presented to the Smithsonian Institution a Master Plan. At the time, it was only a piece of paper. You know what has happened since. The first three phases of development have been completed. The hospital and research building is under construction. We hope construction of the multi-climate house will begin this year. The war in Vietnam will bring a temporary halt, but we believe that we will have a new zoo in the near future.

The Master Plan presented by your organization urged that there be a research and hospital center. We are building it. The Zoo has a scientific department for the first time in its history. You urged an enlargement of the Zoo's educational program, and an excellent beginning has been made. Our architects are at work on plans for an orientation center including a small theater, library, classrooms, and other educational facilities.

You also urged that conservation be increasingly emphasized in the Zoo's activities. One specific recommendation was that the Zoo establish a breeding farm to help preserve those species which are fast vanishing in the wild. The Smithsonian Institution has endorsed this proposal and we are authorized to proceed. We have permission to use 300 acres of excellent land, Smithsonian property, not far from Washington. All we need is money.

The Zoo seal carries four words: recreation, education, research, and conservation. I have been asked to tell you about the fourth objective, conservation.

You might think that zoo keepers and conservationists would be natural cage mates, but they have not been. Conservationists concerned with preserving wild animals once considered zoos their enemies. Zoos are consumers of wild animals. We take pride in

exhibiting rare species such as the giant panda and the hooded crane. We must admit that zoos have not always been scrupulous in their acquisitions. We buy most animals from dealers, often not knowing where or how they were obtained or what laws were violated.

Recently I spent five weeks in South America. One of my missions was to study zoos and talk with zoo directors. Another was to meet and talk with conservationists. I was pre-warned that the conservationists would be suspicious of me, especially if I were linked with local zoo directors. Several zoos there have been openly associated with unscrupulous animal traders. I encountered no hostility. The conservationists were delighted to meet a zoo man who talked conservation. I did find there was little contact between the two groups.

The focal point of worldwide conservation efforts is the International Union for the Conservation of Nature and Natural Resources. Until IUCN's eighth general assembly in 1963, zoos were not represented in its membership. Zoo men who appeared were greeted coolly.

A few weeks after I joined the Zoo staff in 1966, I attended IUCN's ninth general assembly at Lucerne, Switzerland. By then the National Zoo had become an IUCN member. The climate had changed. I was greeted warmly, and I have been deeply involved in IUCN activities ever since.

But what do we mean by conservation? Why are certain animals threatened with extinction, and what can we do about it? Are zoos now, or have they ever been, threats to the survival of wild species?

We can approach an answer by looking at the animal trade. How many live animals were imported by the United States last year? The figures may startle you: 29 million. About 28 million of these were live fish, most of them cultivated, almost all imported for the pet trade.

Next in order were reptiles, including lizards and turtles. More than 400,000 were imported, most of them for the pet trade. More than 200,000 birds were brought to the United States from other continents, most of them for the pet trade.

Let us not pass lightly over this pet trade business. Much of it is destructive and shocking. In April I attended a conference of the Latin American countries in Argentina. One of their chief concerns is finding ways to bring this trade under control. Large areas of South America are being ruthlessly stripped of their wildlife. The conditions of the trade are incredibly bad. In some cases, for every live bird reaching a pet dealer in the United States, three or four may have died. Shipments of birds have arrived in Miami with as many as 90 percent dead. A few months ago, the Secretary of the Treasury agreed to consider humane shipping standards regulations if the American Association of Zoological Parks and Aquariums, cooperating with other groups, would propose suitable standards.

Last year about 74,000 wild mammals entered the U. S. Almost 90 percent of them were primates for research and pharmaceutical institutions. Less than 10 percent of them were for zoos.

Zoos are the chief customers for such ruminants as deer, antelopes, and wild cattle. All U. S. zoos combined have imported only 130 of these, on the average, during the past 10 years.

Throughout the world, the principal threat to wildlife is loss of habitat, not hunting or poaching. The increasing human population is appropriating more and more land. Unless sections of suitable habitat are set aside for a species, it is unlikely to survive. Some of the most threatened animals are those which require the same kind of land humans want for production of food and fiber.

New hazards to survival appear when a species is confined to a portion of its former habitat. Paradoxically, one of the hazards is over-population. Unless controlled by hunting or other predation, species such as our native deer increase until they damage their own food supplies, and many perish of starvation.

Years ago, conservationists thought that protection alone would safeguard wild animals. Today we know that a park or reserve must be managed, and management often requires population control. A planned annual

harvest is often beneficial to a species, and such a harvest can supply meat to hungry people, and live specimens for zoos and other institutions.

Some species are directly threatened by over-exploitation. The American alligator is an example. As matters now stand, the alligators that will be killed illegally in Florida tonight will be skinned and taken across the state line by morning. Tomorrow their skins can be sold legally and openly. Legislation is now pending to stop this slaughter.

Are zoo purchases ever a threat to wild species? Sometimes, yes. Some surviving populations are so small that taking even a few animals adds materially to the danger.

In 1962, the American Association of Zoological Parks and Aquariums recognized this threat and, by resolution, imposed self-discipline upon its members. No member zoo will acquire a Sumatran or Javan rhinoceros, monkey-eating eagle, orangutan, Aldabra or Galapagos tortoise, golden marmoset, or a Zanzibar red colobus monkey without documentary proof that the animal was legally captured and exported. Zoos have joined hands with conservationists, with results becoming evident around the world.

Dr. Reed is President of the AAZPA's Wild Animal Propagation Trust, an organization we had some part in founding. Many zoo leaders participate. This organization seeks to promote the captive breeding of endangered species. Zoo breeding has been severely handicapped because animals of such species are widely scattered. One zoo may have only a male, another an incompatible pair. WAPT intervention results in many transfers and exchanges of such animals to advance propagation.

The Survival Service Commission is a hard-working group of 30 members from 20 countries, with headquarters at Morges, Switzerland. Last year I was invited to membership in the Commission. While I was personally honored by this appointment, its chief significance is that our National Zoo has been recognized internationally as making an important contribution to world wildlife. The strength of the Survival Service Commission, and of its parent organization, the IUCN,

is that its recommendations carry weight with governments throughout the world.

It was an SSC member, Ian Grimwood, who organized and led the expedition which captured several Arabian oryxes, when it was feared the last wild herd had been destroyed. It appeared impossible to protect the species in the wild. The only hope was to establish breeding groups in captivity. As a consequence of this action, there are now 16 Arabian oryxes in the world herd at Phoenix, Arizona, eight of them born there.

Père David's deer and the Przewalski horse have been preserved only by captive breeding. Our National Zoo is among those which are taking a share of responsibility for captive breeding of species that may not long survive in the wild state. Watch the changes that are made in our Zoo. You will see that many of them have as their aim the improvement of breeding arrangements. We can no longer afford to keep animals on exhibition until they die, then replace them with wild-caught stock. We can maintain the quality of our collection only if we do more and more breeding here.

This means doing everything we can to make sure that the animals of breeding age have potential mates. It means surrounding them with the conditions which improve the likelihood that propagation will occur. We have accepted responsibility for the golden marmoset, and we are now revising several cages in the small mammal house to provide proper conditions for this species. This year a Père David deer was born. We hope this was only the first of many births. We plan to maintain a growing herd of this species.

The range of our scientific activities is broad. John Eisenberg's work in Ceylon will help the Government there to manage its wildlife so that it can be preserved with a minimum of conflict with agriculture. In our temporary laboratories at the Zoo, one area of investigation is reproduction, and Dr. Eisenberg has succeeded in breeding species which have never before propagated in captivity.

At one time the animals in zoos were curiosities, representatives of little known wild populations. Today far too many of them are rarities, among the last of their kind, and



toward them we feel a keen sense of responsibility.

You also have a part to play. The Friends of the Zoo recognized the need for this activity in their first major proposals to us. You have been helpful to John Eisenberg in support of his work in Ceylon. The panda standing outside your kiosk collects money for the World Wildlife Fund. I am sure there will be many more ways in which we can effectively work together on behalf of the wild species to which this Zoo is dedicated.

### THE DOCENTS

The Friends of the National Zoo docent program is off to a flying start. Two training courses have been held and thirty members of the Friends are now qualified to guide groups through the Zoo.

By the end of the summer we estimate that we shall have given guided tours to about 3,000 children. This includes the "Summer in the Parks" program to which the docents were committed for three full days a week during July and August and special tours requested by various schools and other groups.

As the program progressed we learned much from experience. The docents not only needed to be able to communicate with children—they had to learn to reduce the very detailed and technical information given by Miss Marion McCrane in the training program to the level of the group they were guiding. Children ask very unexpected questions and you have to be quick-off-the-mark to give satisfactory answers.

Physical stamina is important, too. During the five days of the training course, the Zoo's 165 acres seem more like 500, and in 95° heat even the downhill paths seem uphill. No doubt the winter will present other problems.

Hours for the five days of training are from ten to three, with an hour off for lunch and a much needed rest. The Zoo is covered completely—on foot—including the commissary, hospital, supply room and other behind-the-scenes areas. It is essential to take copious notes and to have a thorough knowledge

of the course text book "Zoo Animals." Outside reading is advised. The recommended books are available to be used in the Zoo administration building. Many of our present docents spent many extra hours becoming acquainted with the individual animals and studying the signs.

—Isabel McDonnell

### NEW PERSONNEL

Donald D. Bridgwater, Wildlife Biologist, joined the staff on March 8th, and is currently serving as the Coordinator of the Department of Living Vertebrates (formerly known as the Animal Department).

Born in Dodge City, Don has spent most of his life in the midwest, namely Kansas and Oklahoma. He holds a Bachelor of Science degree in biology from Bethany Nazarene College, a Master's degree in ornithology from Oklahoma State University, and has two years' credit toward his doctorate (ecology and behavior of the 13-lined ground squirrel) at the University of Oklahoma.

After receiving his Master's degree, Don taught for four years (assistant professor, biology) at his undergraduate alma mater. Then from 1966 to March of 1968 he was Scientific Curator at the Oklahoma City Zoo. In this capacity, he was responsible for birds and small mammals, including all scientific aspects of these collections—research, technical information, diets, management, displays, etc. While with the Oklahoma City Zoo he did most of his work on the ground squirrels, and there he had to leave a critical part of his research project, a one-acre enclosure and its squirrel population. Nevertheless, Don hopes to finish his Ph.D. here in Washington.

Don Bridgwater's vocation and avocation are ecology and animal behavior, and in connection with his primary interest he is the author of a number of technical papers that have appeared in such publications as SOUTHWESTERN NATURALIST, PROCEEDINGS OF THE OKLAHOMA ACADEMY OF SCIENCE, JOURNAL OF MAMMALOGY, and the INTERNATIONAL ZOO YEARBOOK.

—Marion P. McCrane

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A tree-toad loved a she toad  
That lived up in a tree;  
She was a three-toed tree toad  
But a two-toed toad was he.

The two-toed tree toad tried to win  
The she toad's friendly nod,  
For the two-toed tree toad loved the ground  
That the three-toed tree toad trod.

But vainly though the two-tied tree toad tried  
He could not pleas her whim.  
In her tree toad bower, with her V-toed power  
That she toad vetoed him.

Anon

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Letter to the Editor

Dear Mrs. Mann:

Please accept our gratitude for the current "Spots and Stripes". We (my wife and I) always look forward to its arrival. This issue, it seems to me, reached that consummation devoutly to be wished but not always achieved in scientific or even para-scientific literature: it was both entertaining and instructive. I am sure that it would have had Dr. Mann's approval—and that is high praise.

Sincerely yours,

H. R. Baukhage

### ZOO NITE A WET SUCCESS

The FONZ annual Zoo Nite, May 24, came off rainy, with a slight chill in the air, but nevertheless 542 intrepid members showed up to be showed around. The group gathered in the slight drizzling rain at the kiosk and the newly trained docents had their "trial by fire" (or rather, by rain) as they stepped off with about 25 people in each group. The tours began at the lion house and went on to the monkey house, commissary, reptile house,

down Beaver Valley to feed the sealions, past the bear line (where bear food was available) and then to the cafeteria for beer, soft drinks, potato chips, pretzels, and animal crackers.

An innovation and a great treat (apart from the animals) was the beautiful blending of voices of the Friends of Opera in Washington, backed by a professional accordionist. Due to the non-cooperating weather, the group entertained in the cafeteria.

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### ANNUAL MEETING

A sparse but eager group of members attended the 10th annual meeting of the Friends of the National Zoo, held in the elephant house on June 10th.

Thanks to keeper Al Perry's ministrations, the restless animals munched contentedly on bits of fodder tucked into their cages. Little Dillon Rhino added his strange "peep" as emphasis to the spoken word. Tarun Rhino screeched his cheek plates against the wall and the hippos occasionally would burp quietly and politely. Richard, the normally strident and obstreperous cockatoo, was for once subdued and never tried to compete with the speaker. The residents of the elephant house were remarkably well behaved. Even a lone cockroach heading for Mrs. Harlan had second thoughts and, when about four feet from her, put its gears into reverse, heading off in another direction.

Following the business meeting, Mrs. Cazenove Lee was presented with the second annual Mohini Award. Dr. Reed, in making the presentation, lauded her efforts as head of the membership committee which in a few short months more than doubled the membership in FONZ from 462 to 1,051.

The speaker of the evening was Assistant Director John Perry, whose remarks, in abridged form, are printed in this issue.

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Editor: Lucile Q. Mann

